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never been dissociated from each other, the suggestion is made that, in more subdued form, some such actions occur as the correlate of all states of displeasure. The particular form of expression of helplessness by the cry has been preserved together with its subjective correlate, pity, as a fundamental psychosocial situation."

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Sur la compatibilité des axiomes de l'arithmétique. M. PIERI. *Revue de Métaphysique et de Morale,* March, 1906. Pp. 196–207.

This paper presents an admirable opportunity to the logician who wishes to study some of the methods prevalent in the modern logic of mathematics, without involving himself too deeply in the technicalities of the subject. It is really a reply to criticisms of M. Poincaré in the November and January numbers of the *Revue,* although no direct reference is made to them. The first part of the paper (to p. 203) is devoted to an account of the method by which the consistency and independence of a set of postulates constituting a nominal definition are proved, and the last part vindicates the possibility of the proof of consistency for the postulates of arithmetic.

The only method[1] of proving consistency which is in general use is to exhibit, within some accepted region independent of the defining postulates, an entity with respect to which all the postulates permit of interpretation together. While easy to state, this condition is difficult to fulfill in particular cases, and in the realm of pure logic it can never be fulfilled without a *petitio principii,* so we have to accept this realm as given and trust that our postulates represent a correct analysis of it.

Hilbert[2] has also urged that we can not define the fundamental concepts of arithmetic in terms of pure logic without a vicious circle because pure logic already involves certain fundamental arithmetical concepts such as 'class' and, in a way, the concept of the whole number. If this were true, we could no more prove the compatibility of the postulates of arithmetic than of pure logic. Pieri, however, believes that such notions as 'is a,' 'each,' 'all,' 'class,' 'contains,' etc., are not truly arithmetical and that even when we use such ideas as 'both' or 'two men' it is not necessarily an arithmetical notion which we are using, but only a perceived instance of a numerable class, and furthermore such foreshadowings of arithmetical notions must occur in the material by which we are to define numbers, on the principle that *ex nihilo nihil fit.*

The definition of whole numbers (ordered classes of similar classes) through postulates, as given by Padua, serves to enforce the point and justify the proof of the compatibility of the axioms of arithmetic. The whole method is of great interest and beauty, but while its utility is great from the standpoint of the mathematician who is anxious to discover with what concepts he is dealing, to the non-mathematical logician it is also stimulating through the fundamental concepts which it proposes for investigation.

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[1] But cf. Hilbert, Verhandlungen des III. Mathematiker-Kongresses (1904); Trans., *Monist,* July, 1905.

[2] *Loc. cit.*

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